

## 2. Environmental Compliance

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### **Abstract**

It is the policy of the U.S. Department of Energy (DOE) Oak Ridge Operations Office to conduct its operations in compliance with federal, state, and local environmental protection laws, regulations, compliance agreements and decrees, settlement agreements, executive orders, DOE orders (as incorporated into the operating contracts), necessary and sufficient standards, and best management practices. DOE and its contractors make every effort to conduct operations in compliance with the letter and intent of applicable environmental statutes. The protection of the public, personnel, and the environment is of paramount importance.

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### **2.1 INTRODUCTION**

Three of the most significant challenges faced by the DOE facilities in Oak Ridge are to maintain scientific and technical excellence, to increase productivity, and to cut costs, while doing so without compromising environmental, health, or safety protection. Toward that end, policy and strategy have been formulated at the national level, calling for contract reforms and stakeholder involvement in shaping the future of the DOE mission. At the local level, the DOE Oak Ridge Operations Office (DOE-ORO) and its contractors are redefining local missions and are refocusing technical capabilities and expertise to maintain the leadership role of the ORR facilities as premiere research institutes to better serve the nation.

Consistent with this initiative, there were significant changes at the ORR during 1996. A contract was signed with DOE, effective January 1, 1996, that transferred the responsibility for operating ORNL from LMES to the newly formed LMER. The Analytical Services Organization moved the sample preparation work for environmental radiochemistry and bioassay to a new building off the ORR. The laboratory is located in Union Valley just east of the Y-12 Plant and is known as the Union Valley Sample Preparation Facility. Other DOE operations on the ORR include the Scarboro Operations, managed by ORISE, and the operation of the Oak Ridge Water plant by Johnson Controls World Services, Inc.

In another move to reshape the ORR, DOE announced its intention to rebid the EMEF contract, which includes the ETPP and EMEF-funded activities at the ORNL, Y-12, Paducah, and

Portsmouth facilities. Both LMES and LMER are DOE prime contractors.

DOE's operations on the reservation are required to be in conformance with environmental criteria established by a number of federal and state statutes and regulations, executive orders, DOE orders, work smart standards (WSS), and compliance and settlement agreements.

Principal among the regulating agencies are the U. S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC). These agencies issue permits, review compliance reports, participate in joint monitoring programs, inspect facilities and operations, and oversee compliance with applicable regulations.

During routine operations or when ongoing self-assessments of compliance status identify environmental issues, the issues are discussed with the regulatory agencies in an effort to ensure that compliance with all environmental regulations will be sustained. In the following sections, compliance status for the ORR sites with regard to major environmental statutes and DOE orders is summarized by topic.

### **2.2 COMPLIANCE ACTIVITIES**

#### **2.2.1 Resource Conservation and Recovery Act**

The Resource Conservation and Recovery Act (RCRA) was passed in 1976 to address management of the country's huge volume of solid

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waste. The law requires that EPA regulate the management of hazardous waste, which includes waste solvents, batteries, and many other substances deemed potentially harmful to human health and to the environment. RCRA also regulates underground storage tanks (USTs) used for the storage of petroleum and hazardous substances; recyclable used oil; and batteries, mercury thermostats, and selected pesticides or universal wastes.

Subtitle C of RCRA controls all aspects of the management of hazardous waste, from the point of generation to treatment, storage, and disposal (TSD). Hazardous waste generators must follow specific requirements for handling these wastes.

The Y-12 Plant, ORNL, and the ETPP are large-quantity generators. Each generates both RCRA hazardous waste and RCRA hazardous waste mixed with radionuclides (mixed waste). The hazardous and/or mixed wastes are accumulated by individual generators at locations referred to as satellite accumulation areas or 90-day accumulation areas, as appropriate, where they are picked up by waste management personnel and transported to a treatment, storage, or disposal facility. At the end of 1996, the Y-12 Plant had about 219 generator accumulation areas for hazardous or mixed waste. ORNL had about 350 generator accumulation areas, and the ETPP maintained 206.

The Union Valley Sample Preparation Facility managed by the Analytical Services Organization is also considered a large-quantity generator. At the end of 1996, this facility had ten satellite accumulation areas and two 90-day accumulation areas.

ORISE is classified under RCRA as a conditionally exempt small-quantity generator. Its site accumulation area is located in the Chemical Safety Building on the Scarboro Operations Site.

The Central Training Facility on Bear Creek Valley Road is also classified as a conditionally exempt small-quantity generator. The Transportation Safeguards Division Garage, at present, is a small-quantity generator. However, because of recycling efforts and product replacements, the reduction of hazardous waste generation at this facility should allow its reclassification to a

conditionally exempt small-quantity generator. ORNL's Walker Branch Watershed Laboratory is a conditionally exempt small-quantity generator.

The Y-12 Plant is registered as a large-quantity generator and a TSD facility under EPA Identification (ID) Number TN3890090001. RCRA requires that owners and operators of hazardous waste management facilities have operating and/or postclosure care permits. Most of the units at the Y-12 Plant are being operated under operating permits; however, several units still operate under interim status in accordance with a Part A permit application, the most recent version of which was approved in July 1991. Amended Part A permit applications were submitted to TDEC in December 1991, August 1993, July 1994, and September 1995 but have not yet been acted on. Six RCRA Part B permit applications have been submitted for 20 active storage and treatment units listed on the Part A permit application. Four of these Part B applications have been approved and issued as RCRA operating permits (Table 2.1). The first permit (TNHW-032) was issued by the TDEC on September 30, 1994, for tank storage units.

Three Class 1 permit modifications were submitted to the TDEC in 1996 for Permit TNHW-032. These modifications included updating the contingency plan; modifying the valves at the OD-9 unit; updating forms, attachments, and facility maps; updating inspection requirements for the tanks; installing a drum crusher at the OD-9 unit; and minor modifications to the language in the permit.

Permit TNHW-083 was issued by TDEC on September 28, 1995, for container storage units.

Four Class 1 and one Class 2 permit modifications were submitted to TDEC in 1996 for Permit TNHW-083. These modifications included updating the contingency plan, modifying signage requirements, updating the closure plan requirements, modifying the fire protection system and diking in Buildings 9720-9 and 9811-1 (OD-8), changing the marking requirements for containers in Building 9720-31, adding the capability to accept waste generated from DOE off-site facilities, and minor modifications to the language in the permit.

Table 2.1. RCRA operating permits

Permit Number	Building/description
<i>Y-12 Plant</i>	
TNHW-032	Building 9811-1 Tank Storage Unit (OD-7) Waste Oil/Solvent Storage Unit (OD-9) Liquid Organic Solvent Unit (OD-10)
TNHW-083	Building 9201-4 Container Storage Unit Building 9720-9 Container Storage Unit Building 9720-25 Container Storage Unit Building 9720-31 Container Storage Unit Building 9720-58 Container Storage Unit Building 9811-1 Container Storage Unit Containerized Waste Storage Area (CWSA)
TNHW-084	Building 9206 Building 9212 Building 9720-12 Cyanide Treatment and Storage Unit
TNHW-092	Building 9720-32 Building 9720-59
<i>ORNL</i>	
TNHW-010A	Building 7507 Building 7507W Building 7651 Building 7653 Building 7654 Building 7668 Building 7669 Building 7934
TNHW-010	Building 7652
TNHW-027	Tank 7830A
<i>ETTP</i>	
TNHW-015	K-1435 Toxic Substances Control Act Incinerator
TNHW-015A	Storage of Waste at K-1435
TNHW-056	Container and tank storage
TNHW-057	Container and tank storage

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Permit TNHW-084 was also issued by TDEC on September 28, 1995, for production-associated units.

Four Class 1 permit modifications were submitted to TDEC in 1996 for Permit TNHW-084. These modifications included updating the contingency plan; updating calculations for the Cyanide Treatment Unit; updating forms, attachments, and facility maps; updating inspection requirements; adding allowance of additional container sizes and types; moving and modifying storage racks within the headhouse of Building 9212; and minor modifications to the language in the permit.

Permit TNHW-092 was issued by TDEC on Sept. 3, 1996, for the production and classified waste storage areas, which include Buildings 9720-32 and 9720-59.

One Class 1 permit modification was submitted to the TDEC in 1996 for Permit TNHW-092. This modification included updating a facility map.

Four units at the Y-12 Plant operate under interim-status requirements. Eight wastewater treatment units operate under a RCRA exemption for wastewater treatment units already permitted under the Clean Water Act (CWA).

RCRA postclosure permits for the Y-12 Plant Kerr Hollow Quarry, Chestnut Ridge Security Pits, and New Hope Pond site were received in 1996. (See Sect. 2.2.2 for additional information.)

ORNL is registered as a large-quantity generator and a TSD facility under EPA ID Number TN1890090003. Two additional ORNL facilities (off site of the main ORNL facility) operated as small-quantity generators under EPA ID Numbers TN8981800008 and TN8891800007 in previous years, but in 1996 they did not generate hazardous wastes at levels to be regulated as small-quantity generators. One site generated no waste; the other site (Walker Branch Watershed Laboratory) generated less than 100 kg each month and was regulated as a conditionally exempt small-quantity generator.

ORNL's most recent Part A revision on August 9, 1996, included 34 units. Two units were removed from the Part A in that revision (proposed Building 7573, which will not be built, and

Building 7860, which was closed). During 1996, 24 units operated as interim-status or permitted units, and another 10 units were proposed (new construction). Construction was essentially completed on three new storage units: 7668 for mixed wastes, 7883 for transuranic (TRU) mixed wastes, and 7572 for contact-handled TRU mixed waste storage. Wastes were not stored in those three units or in Building 7574 (awaiting final readiness review approval) during 1996.

ORNL has received three RCRA permits (see Table 2.1). During 1996, eight units continued to operate under a 1995 Part B Permit (TNHW-010A). Building 7652 continued to operate under a 1986 Part B Permit [TNHW-1890090003 (or TNHW-010) and HSWA TN-001]. Tank 7830A continued to operate under a 1992 Part B Permit (TNHW-027).

Six Class 2 permit modifications (two for each of the three permits) were submitted to TDEC in 1996 to incorporate F039 and the newly listed carbamate wastes; to add two portable-sampling handling units; and to update the Contingency Plan, Training Plan, and maps. TDEC issued a notice of deficiency (NOD) on the 1993 permit application for the TRU waste storage units in January 1996. ORNL responded to the NOD in February and issued a revised permit application in July that added seven additional units. TDEC action on that permit application is pending. On September 27, 1996, TDEC rescinded the Class 1a modification that they had approved in September 1995, eliminating the East Tennessee Economic Council and LMES as co-operators on the permit for Building 7652.

The ETTP is registered as a large quantity generator and a TSD facility under EPA ID Number TN0890090004. The ETTP has received four RCRA permits (see Table 2.1). The K-1435 Toxic Substances Control Act (TSCA) Incinerator is a hazardous waste treatment unit operating under a RCRA permit (TNHW-015) issued by TDEC on September 28, 1987. A revised RCRA permit based on trial burn results was received in December 1995. A reapplication of this permit was submitted to TDEC in March 1997. A second permit (TNHW-015A) is for storage of waste at the incinerator. Two other permits (TNHW-056

and TNHW-057) cover container and tank storage at various locations throughout the plant.

1996 modifications to the ETTP RCRA permits include an update of contingency plan information, modifications to inspection schedules, the implementation of broader use of process knowledge, and repackaging activities.

### **2.2.1.1 RCRA Assessments, Closures, and Corrective Measures**

The Hazardous and Solid Waste Amendments (HSWA) to RCRA, passed in 1984, require any facility seeking a RCRA permit to identify, investigate, and (if necessary), clean up all former and current solid waste management units (SWMUs). The HSWA permit for the ORR was issued as an attachment to the RCRA permit for Building 7652 at ORNL. The HSWA permit requires DOE to address past, present, and future releases of hazardous constituents to the environment. Many HSWA permit requirements have now been integrated into the ORR federal facilities agreement (FFA). (See Sect. 2.2.2 for details.) EPA issued a preliminary draft of an updated HSWA permit (HSWA TN-001) in August 1996 for DOE review. Lockheed Martin staff and DOE staff submitted comments and suggested changes on the draft permit for EPA consideration. EPA action is pending on that comment package.

At the Y-12 Plant, 26 RCRA units have been certified closed by TDEC since the mid-1980s. Closure of the 9409-5 Tank Storage Area was completed in 1996, as was the Uranium Treatment Unit. The Interim Reactive Waste Treatment Area is an additional RCRA unit requiring closure at the Y-12 Plant. A closure plan for the unit was submitted to TDEC on November 18, 1996.

The RCRA closure of the northern section of the Interim Drum Yard was completed in 1996; however, TDEC did not accept the closure certification package because legacy soil contamination was discovered at the site during closure activities. Further corrective action for this unit has been deferred by TDEC to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigation for the

Upper East Fork Poplar Creek (UEFPC) Characterization Unit.

ORNL's Solid Waste Storage Area (SWSA) 6, which operated as a disposal facility for RCRA wastes, has not accepted RCRA wastes since 1986. SWSA 6 is currently undergoing RCRA/CERCLA closure. A revised Closure Plan for SWSA 6 (which included the disposal areas, the Hillcut Test Facility, and the Former Explosives Detonation Trench) was resubmitted in July 1995 to TDEC and EPA. The revisions focused on the integration of CERCLA remediation processes while still addressing the RCRA closure requirements. On November 26, 1996, TDEC approved one portion of the SWSA 6 Closure Plan revision: the request to discontinue the maintenance and repair of the interim caps. TDEC action is still pending on the balance of the Closure Plan, and on the DOE submittal of the associated Environmental Monitoring Plan and Post-Closure Permit Application.

Closure of the New Hydrofracture Surface Facility was completed in April 1996, and closure was approved by TDEC in May 1996. A revised Closure Plan for Building 7555 was submitted to TDEC in October 1996. TDEC approval of the Building 7555 Closure Plan is pending. TDEC approval of a Closure Plan for the Remote-Handled Transuranic Waste Burial Ground, which was submitted in September 1995, is still pending. ORNL is revising a Closure Plan for the Reactive Chemical Facility to incorporate new regulatory requirements. It will be resubmitted to TDEC in fiscal year (FY) 1997.

At the ETTP, closure of the K-1419 and K-1417-A units was completed, and certification of closure was submitted to TDEC in December 1996.

### **2.2.1.2 Land Disposal Restrictions**

The 1984 RCRA amendments established land disposal restrictions (LDRs), which prohibit the land disposal of untreated hazardous wastes. The amendments require that all untreated wastes meet treatment standards before land disposal or that they be disposed of in a land disposal unit from which there will be no migration of hazard-

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ous constituents for as long as the waste remains hazardous. These restrictions also prohibit storage of restricted hazardous or mixed waste except as necessary to facilitate recovery, treatment, or disposal.

Currently, with the exception of a few organic mixed wastes, the same restrictions apply to mixed wastes, which are composed of a mixture of radioactive and hazardous wastes. In June 1992, negotiation was completed on a Federal Facilities Compliance Agreement (FFCA) to resolve the compliance issue of storing restricted waste for a period longer than is necessary to facilitate recovery, treatment, or disposal. The agreement contained a compliance schedule for submittal of strategies and plans for treatment of the backlog of restricted waste through a variety of treatment options. In September 1992 the Federal Facility Compliance Act was passed by Congress to address the extended storage of mixed waste by DOE through agreement with host states. A Tennessee commissioner's order signed on September 26, 1995, culminated negotiations between DOE and the state and established a schedule for treatment and disposal of DOE's mixed waste at Oak Ridge facilities.

### 2.2.2 RCRA-CERCLA Integration

The CERCLA and RCRA corrective action processes are similar. Each process has four steps with similar purposes (Table 2.2).

EPA, DOE, and TDEC have negotiated the ORR FFA to ensure that the environmental impacts associated with past and present activities at the ORR are thoroughly investigated and that appropriate remedial actions or corrective measures are taken as necessary to protect human health and the environment. This agreement established a procedural framework and schedule for developing, implementing, and monitoring response actions on the ORR in accordance with CERCLA. The ORR FFA is also intended to integrate the corrective action processes of RCRA and CERCLA.

For example, in April 1993, DOE, TDEC, and Martin Marietta Energy Systems, Inc., signed an agreed order regarding the RCRA postclosure permit for the S-3 Site at the Y-12 Plant, formally agreeing to proceed with CERCLA as the lead regulatory program and with RCRA as an applicable or relevant and appropriate requirement (ARAR), to the extent that postclosure maintenance and care of former interim-status units will be conducted in compliance with the terms of RCRA postclosure permits. Groundwater monitoring will be integrated with CERCLA programs, and corrective actions will be deferred to CERCLA. Reporting of groundwater-monitoring data will comply with RCRA postclosure permit conditions as well as CERCLA requirements.

Three RCRA postclosure permits, one for each of the three hydrogeologic regimes at the Y-12 Plant, have been issued and incorporate the seven major former waste disposal areas at the Y-12 Plant. These are noted in Table 2.3.

Table 2.2. RCRA and CERCLA corrective action processes

RCRA	CERCLA	Purpose
RCRA facility assessment	Preliminary assessment/site investigation	Identify releases needing further investigations
RCRA facility investigation	Remedial investigation	Characterize nature, extent, and rate of contaminant releases
Corrective measures study	Feasibility study	Evaluate and select remedy
Corrective measures implementation	Remedial design/remedial action	Design and implement chosen remedy

**Table 2.3. Postclosure permits for Y-12 Plant hydrogeologic regimes**

Hydrogeologic regime	Waste area	Postclosure permit
Bear Creek Valley	1. Bear Creek Burial Grounds (including the walk-in pits) 2. Oil Landfarm 3. S-3 Pond Site (west)	TNHW087
Chestnut Ridge	1. Chestnut Ridge Sediment Disposal Basin 2. Chestnut Ridge Security Pits 3. Kerr Hollow Quarry	TNHW088
Upper East Fork Poplar Creek	1. New Hope Pond 2. S-3 Pond site (east)	TNHW089

TDEC issued a Class 3 modification to the Chestnut Ridge Hydrogeologic Regime RCRA postclosure permit effective September 19, 1995, and issued the final Chestnut Ridge Security Pits modification to the Chestnut Ridge Hydrogeologic Regime RCRA postclosure permit on March 8, 1996. In addition, TDEC issued the Kerr Hollow Quarry modification to the Chestnut Ridge Hydrogeologic Regime RCRA postclosure permit on June 11, 1996. The Upper East Fork Poplar Creek Hydrogeologic Regime permit, which incorporates New Hope Pond and the eastern plume of the S-3 Pond, was issued on August 30, 1996.

### 2.2.3 Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, also known as Superfund, was passed in 1980 and was amended in 1986 with passage of the Superfund Amendments and Reauthorization Act (SARA). Unlike the other

basic regulatory programs summarized in this chapter (such as RCRA or CWA), CERCLA is a process to respond to environmental problems using other environmental laws and standards to guide the response action. Under CERCLA, abandoned or uncontrolled hazardous waste sites where a release has occurred or may have occurred are investigated, and a site is remediated if it poses significant risk to health or the environment. CERCLA requires that EPA place sites needing CERCLA response on the National Priorities List (NPL). The ORR was placed on the NPL in December 1989.

The DOE-Headquarters (DOE-HQ) Office of Environmental Restoration (EM-40) has initiated the Management Action Process (MAP) as a tool to assist DOE and contractor management and technical personnel, regulators, and stakeholders in capturing, evaluating, and documenting information essential for program planning, decision making, and implementation of environmental restoration at DOE facilities. Furthermore, DOE has developed a strategic plan to expedite the remediation of DOE facilities and to transition use of some of the facilities to the private sector.

In November 1996, DOE-ORO issued the *Environmental Restoration (ER) Program Management Action Process Document for the Oak Ridge Reservation* (DOE 1996a). This MAP document represents a concise “snapshot” of the Oak Ridge ER Program and includes a summary of past accomplishments; the status of the Oak Ridge ER Program; and future strategy, rationale, schedule, and funding requirements necessary to meet program objectives. It is important to note that the Oak Ridge ER Program is in transition. The program is moving from a contracting approach that was basically “level of effort” to an aggressive incentive approach. Goals have been established to transfer 60% of the ER Program projects to incentive task orders in FY 1997.

Based on discussions with both federal and state environmental regulators, the MAP document is expected to replace the *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program* (DOE 1995a).

## 2.2.4 Federal Facility Compliance Agreement

The Federal Facility Compliance Act was signed on October 6, 1992, to bring federal facilities (including those under DOE) into full compliance with RCRA. The act waives the government's sovereign immunity, allowing fines and penalties to be imposed for RCRA violations at DOE facilities. In addition, the act requires that DOE facilities provide comprehensive data to EPA and state regulatory agencies on mixed-waste inventories, treatment capacities, and treatment plans for each site. The act ensures that the public will be informed of waste treatment options and encourages active public participation in the decisions affecting federal facilities. TDEC is the authorized regulatory agency under the act for the DOE facilities in the state of Tennessee.

Site treatment plans are required for facilities at which DOE generates or stores mixed waste. The purpose of the site treatment plan was to identify to TDEC the proposed options (treatment method, facility, and schedule) for treating mixed waste at the ORR. For some waste types, these options included continued waste characterization for use, development, and/or modification of treatment technologies.

DOE-ORO and EPA signed the ORR-LDR FFCA on June 12, 1992, to allow storage of mixed wastes on the Reservation. As a result, the site treatment plan (STP) was provided to the EPA pursuant to the requirements contained in the ORR-LDR FFCA. To the extent possible, the STP designated specific facilities for the treatment of mixed waste and proposed schedules as set forth in the FFCA. If it was not possible to designate facilities or to adhere to schedules, the STP provided schedules for alternative activities, such as waste characterization and technology assessment. The main treatment strategies are as follows:

- Existing and modified on-site facilities will be used to treat mixed waste when possible.
- Off-site DOE capacity will be used when available and appropriate.

- When available and technically appropriate (based on factors such as risk and cost), commercial-sector resources will be used to treat mixed wastes. Waste types targeted for commercial treatment include inorganic sludges and soils.
- The minimum set of new on-site facilities will be built to treat those wastes for which commercial treatment is unavailable or unsuccessful.
- TRU mixed wastes will be treated only as necessary to meet the waste acceptance criteria of the Waste Isolation Pilot Plant (WIPP) in New Mexico.

The plan calls for mixed low-level (radioactive) waste (LLW) on the ORR to be treated by a combination of commercial treatment capabilities and existing and modified on-site treatment facilities. Mixed TRU waste streams on the ORR, composed of both contact- and remote-handled wastes, will be treated in the proposed Transuranic Processing Facility (TPF) only as necessary to meet the waste acceptance criteria for disposal at the WIPP. Nine existing on-site facilities will be used to treat inventoried low-level mixed waste. Construction of one new major on-site facility (the TPF) is proposed for the ORR, as described in the plan. The final configuration of new on-site facilities for mixed LLW streams will depend on the extent to which commercial resources are available.

The STP was issued to TDEC on April 4, 1995. TDEC has reviewed and modified the plan in accordance with Section 3021(b)2 of RCRA. TDEC has issued a commissioner's order (effective October 1, 1995) that requires compliance with the approved plan.

The STP provides overall schedules, milestones, and target dates for achieving compliance with LDR; a general framework for the establishment and review of milestones; and other provisions for implementing the STP that are enforceable under the commissioner's order.

Semiannual progress reports will document the quantity of LDR mixed waste in storage at the end of the previous six-month period and the estimated quantity to be placed in storage for the



next five fiscal years. Descriptions will be provided of (1) the progress for treatment of each waste stream during the previous six-month period and (2) new treatment development. Additionally, the progress report will provide information such as addition or deletion of waste streams, funding activities, any needs involving changes in waste form or code, and any technology or capacity.

Annual updates of the STP may contain requests for approval of changes. The requests may include, as appropriate, (1) proposed revisions or conditionally approved revisions, (2) proposed new milestones, and (3) other changes to the overall schedule. The first annual report covering CY 1995 was submitted as required in 1996.

The STP will terminate when there is no longer any LDR mixed waste being stored on the ORR, regardless of when it was generated. In the absence of an STP, LDR mixed-waste storage would be in violation of RCRA Section 3004(j).

### 2.2.5 Underground Storage Tanks

USTs containing petroleum and hazardous substances are regulated under RCRA, subtitle I, regulations (40 CFR 280); USTs that contain petroleum are regulated under Tennessee Rule 1200-1-15 (UST Program) in addition to being subject to 40 CFR 280.

ORNL has a total of 54 USTs registered with the TDEC Division of Underground Storage Tanks (DUST) under facility ID # 0-730089 (ORNL). Three of the six tanks remaining in service have been replaced or upgraded to meet the final 1998 standards for new tank installations and will continue in service for the remainder of their reasonable life expectancy. The other three tanks remaining in service are emergency generator fuel tanks (subject only to notification and release response requirements until December 22, 1998) and are scheduled for closure during CY 1997.

The other 48 registered USTs are out of service or are not subject to regulation by TDEC and fit into the following categories: 4 tanks closed after release of petroleum, site status

monitoring required; 13 tanks closed with a clean site but have not received final closure letter from TDEC/DUST; 23 tanks closed by TDEC/DUST final closure letter or the tank was closed prior to 1988; 8 tanks registered with TDEC/DUST but not subject to regulation under 40 CFR 280 or TN 1200-1-15. The eight include five radwaste tanks, two heating oil tanks, and one waste water overflow tank.

The ORNL UST Program was also given responsibility for, and completed the closure of, three additional USTs, each of which was registered to another facility. Another four USTs at ORNL were never required to be registered because of their size or because they were closed prior to 1980. Table 2.4 presents the status of USTs on the ORR.

The Y-12 Plant UST Program includes four active petroleum USTs that meet all current regulatory compliance requirements. The UST registration certificates for these tanks are current,

Table 2.4. ORR UST status, 1996

	Y-12 Plant	ORNL	ETTP
Active/in-service	4	3	2
Closed	40	48 <sup>a</sup>	14
Hazardous substance	3 <sup>b</sup>	0	6 <sup>c</sup>
Upgraded	0	3	0
Known or suspected sites	0	0	16
Total	47	54 <sup>d</sup>	38

<sup>a</sup>Closed tanks include two hazardous substance tanks, both of which were excavated, removed, and dismantled.

<sup>b</sup>Two USTs are deferred because they are regulated by the Atomic Energy Act of 1954. The third is a permanently closed methanol UST.

<sup>c</sup>Four USTs, one of which has been closed, were used to store natural gas odorant and are regulated under the Pipeline Safety Act. A fifth UST, designed as a spill-overflow tank, has never been placed into service.

<sup>d</sup>Typographical error last year gave total as 55.

and certificates are posted at the UST locations, enabling fuel delivery until March 31, 1998.

At four other former Y-12 Plant UST sites, alternatives to “active remediation” are being pursued. These alternatives include the Site Ranking for the 9201-1 and 9204-2 UST sites and a Site Specific Standard Request (SSSR) for the East End Fuel Facility (9754 and 9754-2) and the Rust Garage Facility (9754-1 and 9720-15) UST sites. If the sites qualify by TDEC DUST rules for these alternatives, and with approval by the TDEC, the tank owner/operator is allowed to conduct semiannual groundwater monitoring in lieu of a remediation scenario.

TDEC approval for the site ranking for the 9201-1 and 9204-2 UST sites is in the second year of the monitoring-only program. Closure reports for these two sites were submitted in March 1997 to TDEC for final closure.

TDEC did not grant approval for SSSR for the Rust Garage Facility. However, because this site is affected by commingling plumes from adjacent former hazardous waste disposal sites, the state has approved further investigation and remediation of this site to be addressed through the CERCLA process. Additionally, TDEC did not approve the SSSR for the East End Fuel Station USTs. A petition has been made to the TDEC UST Board to reconsider the request. If the TDEC board denies the petition, a corrective action implementation plan will be required and a schedule for corrective action will be developed.

A detailed description of all ORNL, Y-12 Plant, and ETTP USTs and their current status is included in Appendix E.

### 2.2.6 National Environmental Policy Act

The National Environmental Policy Act (NEPA) provides a means to evaluate the potential environmental impact of proposed federal activities and to examine alternatives to those actions. Table 2.5 notes the types of NEPA activities conducted at the ORR during 1996.

LMES operates under a procedure that establishes administrative controls and provides requirements for project reviews and compliance

with NEPA. Provisions apply (1) to the review of each proposed project, activity, or facility for its potential to result in significant impacts to the environment and (2) to the recommendation based on technical information of the appropriate level of NEPA documentation. The NEPA review process results in the preparation of NEPA documents, and federal, state, and local environmental regulations and DOE orders applicable to the environmental resource areas must be considered when preparing NEPA documents. These environmental resource areas include air, surface water, groundwater, terrestrial and aquatic ecology, threatened and endangered species, land use, and environmentally sensitive areas. Environmentally sensitive areas include floodplains, wetlands, prime farm land, habitats for threatened and endangered species, historic properties, and archaeological sites. Each ORR site NEPA program also maintains compliance with NEPA through the use of its site-level administrative and operational procedures. These procedures assist in establishing effective and responsive communications with program managers and project engineers with the goal of establishing NEPA as a key consideration in the formative stages of project planning.

ORNL has supported the preparation of an environmental assessment (EA). *Proposed Changes to the Sanitary Sludge Land Application Program on the Oak Ridge Reservation* (DOE 1996c) has been approved, and a finding of no significant impact (FONSI) has been issued.

Much of the NEPA activity at the ETTP during 1996 involved leasing land and facilities. A draft EA is being written with the following objectives: (1) to describe the baseline environmental conditions at the site, (2) to analyze potential generic impacts to the baseline environment from future tenant operations, and (3) to identify and characterize cumulative impacts of future industrial uses of the site. In addition, the EA will provide DOE with environmental information to be used in developing lease restrictions.

In 1996, DOE leased two facilities at the ETTP and one parcel of land on the ORR. Parcel ED-1 was leased by Community Reuse Organization of East Tennessee (CROET) for development

Table 2.5. NEPA activities during 1996

Types of NEPA documentation	Y-12 Plant	ORNL	ETTP	ORISE
Categorical exclusion (CX) recommendation	9	32 <sup>a</sup>	8	
CX granted	9	16	8	
Approved under general CX documents	49	57	42	7
Environmental assessment	0	4	0	
Special environmental analysis	0	0	0	
Programmatic environmental assessment	0	1 <sup>b</sup>	0	
Supplemental analysis	0	1 <sup>c</sup>	0	
Environmental impact statement	0	0	0	
Supplemental environmental impact statement	0	0	0	
Programmatic environmental impact statement	0	0	0	

<sup>a</sup>Includes 16 revised five-site generic CXs under review by DOE-ORO.

<sup>b</sup>Reservation-wide programmatic waste management document in which ORNL had a supporting role; later withdrawn by DOE.

<sup>c</sup>Prepared by ORNL staff for LMES Waste Management Organization.

of an industrial park. An EA was prepared by ORNL personnel to evaluate the lease of Parcel ED-1, and a FONSI was issued in April 1996 (DOE 1996). Other leases at the ETTP included the ETTP Barge Facility (K-710) on the Clinch River, which was leased by CROET for receipt and dispatch of commercial products; and a machine shop in Building K-1401, which was leased for a small-scale metals recycling activity. Other leasing arrangements worked on under NEPA in 1996 involved machine shop operation, a portion of the K-1401 building, and the K-1036 building. Because the future use of these facilities would not change from previous use, the leases were categorically excluded [categorical exclusion (CX) A7, 10 CFR 1021] from NEPA review. Other leases may be approved under CXs if they meet specific criteria defined in 10 CFR 1021.410. The lease of K-1220 for use by a company to conduct equipment fabrication and assembly, a changed use for K-1220, was approved with an individual CX.

### 2.2.6.1 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies take into account the effects of their undertakings on properties included in or eligible for inclusion in the *National Register of Historic Places*. To comply with Section 106 of the NHPA, and its implementing regulations at 36 CFR 800, DOE-ORO has seen to the ratification of a programmatic agreement among DOE-ORO, the Tennessee state historic preservation officer (SHPO), and the Advisory Council on Historic Preservation concerning management of historical and cultural properties on the ORR. The programmatic agreement, ratified on May 6, 1994, outlines DOE-ORO's plan for the management of cultural and historical properties on the ORR. The programmatic agreement stipulates that DOE-ORO will prepare a cultural resource management plan (CRMP) for the ORR and will provide a draft of the CRMP to the Tennessee SHPO and Advisory Council on Historic Preservation within 24 months of the ratification of the agreement.

## Oak Ridge Reservation

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The agreement also stipulates that DOE-ORO will conduct surveys to identify significant historical properties within the ORR. A draft CRMP has been completed and reviewed by the SHPO and the Advisory Council. Comments are now being incorporated into the CRMP, and the CRMP is anticipated to be released for public comment in the near future.

Compliance with NHPA at ORNL, the Y-12 Plant, and the ETTP is achieved and maintained in conjunction with NEPA compliance. The scope of proposed actions is reviewed in accordance with the programmatic agreement and, if warranted, consultation is initiated with the SHPO and the Advisory Council on Historic Preservation, and the appropriate level of documentation is prepared and submitted. ORNL submitted two historical reviews in 1996, and the Y-12 Plant submitted six historical reviews requiring concurrence from the SHPO. Two of the six Y-12 historical reviews required concurrence from the Advisory Council. Three reviews were prepared for submittal in 1996 from the ETTP. The submittals dealt with leasing portions of property and/or land on the ORR.

A survey of the Y-12 Plant to identify sites eligible for inclusion in the *National Register* was completed in 1995, and the Y-12 Plant site archaeological survey was completed in 1996. Final reports for both surveys are expected by the end of 1997. ORR-wide surveys to identify and evaluate pre-World-War II structures and known archaeological sites for eligibility in the *National Register* were completed in 1995. Survey results will be incorporated into the CRMP.

A historical consultant acceptable to the Tennessee SHPO was contracted to conduct a survey of all ORISE structures in order to comply with the NHPA. Two properties, the Freels Cabin and the Atmospheric Turbulence Diffusion Laboratory, were identified as previously included in the *National Register*. Management responsibilities for the Freels Cabin have since been transferred to LMER. Section 106 of the NHPA requires federal agencies to coordinate with the state and allow the SHPO to review proposed demolition projects and other activities adversely affecting existing structures. During the past 3 years,

ORISE removed 40 surplus structures (some requiring decontamination) from the ORR.

### 2.2.6.2 Protection of Wetlands

Executive Order 11990 (issued in 1977) was established to mitigate adverse effects to wetlands caused by destruction or modification of wetlands and to avoid new construction in wetlands wherever possible. Avoidance of these effects is ensured through implementation of the sensitive-resource analysis conducted as part of the NEPA review process. Protective buffer zones and application of best management practices (BMPs) are required for activities on the ORR. Coordination with TDEC, the U.S. Army Corps of Engineers, and TVA is necessary for activities involving waters of the United States, which include wetlands and floodplains. This is also true for the state and waters of the state. Generally, this coordination results in permits from the Corps of Engineers, TVA, and/or the state.

The ORR implements protection of wetlands through the site NEPA program offices in accordance with 10 CFR 1022, "Floodplain/ Wetlands Environmental Review Requirements." Each of the sites has surveys for the presence of wetlands, and surveys are conducted on a project or program as-needed basis. Wetland surveys and delineations have been conducted on about 14,000 acres (5,668 ha) of the 34,500 acres (13,968 ha) that compose the reservation. About 800 acres (324 ha) of wetlands have been identified in the areas in which surveys have been conducted. Surveys for the remaining 20,500 acres (8,300 ha) are planned to be conducted only as needed.

TDEC has developed a regulatory position on impacted wetlands that includes mitigation; any affected wetlands must be replaced in area and function by newly constructed wetlands or enhancement of previously impacted areas.

The Y-12 Plant has conducted two surveys of its wetlands resources. *Identification and Characterization of Wetlands in the Bear Creek Watershed* (MMES 1993) was completed in October 1993, and a wetland survey of selected areas in the Y-12 area of responsibility was completed in October 1994. The first report surveys the Y-12

Plant and surrounding areas; the second report surveys additional areas for which ER activities are planned.

The Y-12 Plant, ORNL, and ETTP practice wetlands protection by requiring protective buffer zones and other BMPs whenever activities are proposed that may introduce a potential environmental impact. Wetlands protection, documentation, and reporting requirements are administered through the NEPA review and documentation process according to 10 CFR 1022.

In 1995 TDEC approved a wetlands mitigation plan for First Creek at ORNL in conjunction with a sediment-removal project on Melton Branch. Implementation of the plan was completed on schedule in March 1996. The plan required that a one-thousand-linear-foot reach of First Creek be planted in specific trees and shrubs and that it be protected and maintained as a stream enhancement zone. A wetlands survey of ORNL areas, *Wetland Survey of the X-10 Bethel Valley and Melton Valley Groundwater Operable Units at ORNL* (Rosensteel 1996), was completed and published in 1996.

A partial wetlands survey for areas within the ETTP area of responsibility was conducted during the summer of 1994. Not all areas within the ETTP have been surveyed for wetlands, and it is likely that additional locations will be classified as wetlands. The wetlands that have been identified are protected in accordance with NEPA Executive Order 11990.

Since 1994, additional wetland surveys and wetland boundary delineations have been performed in the main ETTP area, at the K-901-A area, the Atomic Vapor Laser Isotope Separation (AVLIS) Site, and the ETTP South Site. The wetlands that have been identified are protected when addressed under NEPA. A revised wetland assessment for site investigation activities at the ETTP was approved by DOE-ORO in December 1996.

In November 1995, TDEC issued a notice of violation (NOV) to DOE for an unpermitted wetland activity associated with pine beetle control reforestation activities at a site near Blair Road. A Wetland Restoration Plan was developed that calls for annual monitoring and reporting for

five years. In April 1996, the wetland restoration was initiated at the site in accordance with the plan.

### 2.2.6.3 Floodplains Management

Executive Order 11988 (issued in 1977) was established to require federal agencies to avoid to the extent possible adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Agencies must determine whether a floodplain is present that may be affected by an action, assess the impacts on such, and consider alternatives to the action. The executive order requires that provisions for early public review and measures for minimizing harm be included in any plans for actions that might occur in the floodplain. Floodplain assessments and the associated notices of involvement and statement of findings are prepared in accordance with 10 CFR 1022, as part of the NEPA review and documentation process.

The *Floodplain Assessment and Statement of Findings for Site Characterization Activities at the ETTP Site* (DOE 1997a) was approved by DOE-ORO in December 1996.

### 2.2.6.4 Plant and Animal Species of Concern

Good stewardship, state laws, and federal laws dictate that animal and plant species of concern be considered when a proposed project has the potential to alter their habitat or otherwise harm them. At the federal level, such species are classified as endangered, threatened, or species of concern; at the state level, species are considered endangered, threatened, or of special concern (plants) or in need of management (animals). All such species are termed threatened and endangered (T&E) species in this report.

### Threatened and Endangered Animals

Listed animal species known to be currently present on the reservation (excluding the Clinch

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River bordering the reservation) are given along with their status in Table 2.6. Other listed species may also be present, although they have not been observed recently. These include several species of mollusks (such as the spiny riversnail), amphibians (such as the hellbender), birds (such as Bachman's sparrow), and mammals (such as the smoky shrew). In particular, the reservation has not been sampled extensively for the several listed bats that may be present. The only federally listed animal species that have been recently observed (the gray bat, bald eagle, and peregrine falcon) are represented by one to several migratory or transient individuals rather than by permanent residents, although this situation may change as these species continue to recover. Similarly, several state-listed bird species, such as the anhinga, olive-sided flycatcher, sandhill crane, double-crested cormorant, and little blue heron are currently uncommon migrants or visitors to the reservation. Others, such as the cerulean warbler, northern harrier, great egret, and yellow-bellied sapsucker, are common migrants or winter residents that do not nest on the reservation.

### Threatened and Endangered Plants

No federally listed plant species are currently known to occur on the ORR. Twenty-four plant species currently known to occur on the ORR are listed by the state of Tennessee, including the fen orchid, pink lady's slipper, and Canada lily (Table 2.7). Four species (spreading false foxglove, Appalachian bugbane, tall larkspur, and butternut) have been under review for listing at the federal level and were listed under the formerly used "C2" candidate designation. Current information is insufficient to determine whether these species may be appropriate for federal listing.

Whorled mountain mint is found on the ORR, but its taxonomy is uncertain. A species of *Pycnathemum* is also present; it is believed to be either *Pycnathemum verticillatum* or *Pycnathemum torrei*. If the presence of either were confirmed, it would be listed by the state. Two additional species listed by the state, *Lilium michiganense* and *Carex oxylepis* (var.

*pubescens*), were identified in the past on the ORR; however, they have not been found in recent years. Several state-listed plant species currently found on adjacent lands may be present on the ORR as well, although they have not been located.

### 2.2.6.5 Environmental Justice

On February 11, 1994, President Clinton promulgated Executive Order 12898, "Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations." The executive order requires that federal actions not have the effect of excluding, denying, or discriminating on the basis of race, color, national origin, or income level. DOE, LMER, and LMES are continuing to work with EPA and other stakeholders to ensure that environmental justice issues are addressed when federal actions are taken on the ORR.

### 2.2.7 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) of 1974 is an environmental statute for the protection of drinking-water sources. The act requires EPA to establish primary drinking-water regulations for contaminants that may cause adverse public health effects. Although many of the requirements of the SDWA apply to public water supply systems, Section 1447 states that each federal agency having jurisdiction over a federally owned or maintained public water system must comply with all federal, state, and local requirements regarding the provision of safe drinking water. Because the systems that supply drinking water to the ORR are DOE-owned, the requirements of Section 1447 apply. The Underground Injection Control (UIC) program, adopted pursuant to the SDWA, regulates the emplacement of fluids into the subsurface by means of injection wells.

Potable water for the city of Oak Ridge, the Y-12 Plant, and ORNL is received from a DOE-owned water-treatment facility located northeast of the Y-12 Plant and is currently managed by East Tennessee Mechanical Contractors in partnership with Johnson Controls World

Table 2.6. Animal species of concern reported from the Oak Ridge Reservation<sup>a</sup>

Species	Common name	Legal status <sup>b</sup>	
		Federal	State
<i>Fish</i>			
<i>Phoxinus tennesseensis</i>	Tennessee dace		NM
<i>Amphibians and reptiles</i>			
<i>Hemidactylium scutatum</i>	Four-toed salamander		NM
<i>Birds</i>			
<i>Haliaeetus leucocephalus</i>	Bald eagle	T	T
<i>Falco peregrinus</i>	Peregrine falcon	T	E
<i>Dendroica cerulea</i>	Cerulean warbler	C	
<i>Pandion haliaetus</i>	Osprey		T
<i>Ammodramus savannarum</i>	Grasshopper sparrow		NM
<i>Accipiter striatus</i>	Sharp-shinned hawk		NM
<i>Accipiter cooperii</i>	Cooper's hawk		NM
<i>Circus cyaneus</i>	Northern harrier		NM
<i>Anhinga anhinga</i>	Anhinga		NM
<i>Casmerodius alba</i>	Great egret		NM
<i>Leucophoyx thula</i>	Snowy egret		NM
<i>Contopus borealis</i>	Olive-sided flycatcher		NM
<i>Grus canadensis</i>	Sandhill crane		NM
<i>Lanius ludovicianus</i>	Loggerhead shrike		NM
<i>Phalacrocorax auritus</i>	Double-breasted cormorant		NM
<i>Sphyrapicus varius</i>	Yellow-bellied sapsucker		NM
<i>Egretta caerulea</i>	Little blue heron		NM
<i>Mammals</i>			
<i>Myotis grisescens</i>	Gray bat	E	E
<i>Sorex longirostris</i>	Southeastern shrew		NM

<sup>a</sup>Land and surface waters of the ORR exclusive of the Clinch River, which borders the ORR.

<sup>b</sup>E = endangered, T = threatened, C = species of concern, NM = in need of management.

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**Table 2.7. Plant species found on the Oak Ridge Reservation and listed by state of Tennessee or federal agencies, 1995<sup>a</sup>**

Species	Common name	Habitat on the ORR	Status
<i>Aureolaria patula</i>	Spreading false-foxglove	River bluff	<i>b, c</i>
<i>Carex gravida</i>	Heavy sedge	Varied	<i>d</i>
<i>Carex howei</i>	Howe sedge	Wetland	<i>e</i>
<i>Cimicifuga rubifolia</i>	Appalachian bugbane	River slope	<i>b, e</i>
<i>Cypripedium acaule</i>	Pink lady-slipper	Dry to rich woods	<i>f</i>
<i>Delphinium exaltatum</i>	Tall larkspur	Barrens and woods	<i>b, c</i>
<i>Diervilla lonicera</i>	Northern bush-honeysuckle	River bluff	<i>e</i>
<i>Draba ramosissima</i>	Branching whitlow-grass	Limestone cliff	<i>f</i>
<i>Elodia nuttallii</i>	Nuttall waterweed	Pond, embayment	<i>f</i>
<i>Fothergilla major</i>	Mountain witch-alder	Woods	<i>e</i>
<i>Hydrastis canadensis</i>	Golden seal	Rich woods	<i>e</i>
<i>Juglans cinerea</i>	Butternut	Slope near stream	<i>b, e</i>
<i>Juncus brachycephalus</i>	Small-head rush	Wetland	<i>f</i>
<i>Lillium canadense</i>	Canada lily	Moist woods	<i>e</i>
<i>Liparis loesellii</i>	Fen orchid	Forested wetland	<i>c</i>
<i>Panax quinquefolius</i>	Ginseng	Rich woods	<i>e</i>
<i>Platanthera flava</i> (var. <i>herbiola</i> )	Tuberculed rein-orchid	Forested wetland	<i>e</i>
<i>Platanthera peramoena</i>	Purple fringeless orchid	Wet meadow	<i>e</i>
<i>Pycnanthemum verticillatum</i>	Whorled Mountain-mint	Barrens, wet meadows	<i>c</i>
<i>Rhynchospora colorata</i>	White-topped sedge	Rocky edge of pond	<i>f</i>
<i>Ruellia purshiana</i>	Pursh's wild-petunia	Dry, open woods	<i>f</i>
<i>Saxifraga careyana</i>	Carey saxifrage	River bluff, sinkhole	<i>f</i>
<i>Scirpus fluviatilis</i>	River bulrush	Wetland	<i>f</i>
<i>Spiranthes lucida</i>	Shining ladies'-tresses	Wetland	<i>e</i>
<i>Spiranthes ovalis</i>	Lesser ladies'-tresses	Moist to dry woods	<i>f</i>
<i>Viola tripartita</i> (var. <i>tripartita</i> )	Three-parted violet	Rocky woods	<i>f</i>

<sup>a</sup>Other lists for the ORR have included *Lillium michiganense* and *Carex oxylepis* var. *pubescens*; they are excluded in this table because they have not been found in recent years.

<sup>b</sup>Under review for federal listing. Listed under the formerly used "C2" candidate designation. More information is needed to determine status.

<sup>c</sup>Endangered in Tennessee.

<sup>d</sup>Endangered in Tennessee because of commercial exploitation.

<sup>e</sup>Threatened in Tennessee.

<sup>f</sup>Special concern in Tennessee.



Services, Inc. Both ORNL and the Y-12 Plant are designated as non-transient, non-community water-distribution systems by the TDEC Division of Water Supply and are subject to the Tennessee Regulations for Public Water Systems and Drinking Water Quality, Chapter 1200-5-1. Under the TDEC regulations, distribution systems that do not perform water treatment can use the records sent to the state by the water treatment facility from which water is received to meet applicable compliance requirements. In 1996, the DOE water treatment plant met all of the Tennessee radiological and nonradiological standards.

ORNL's water system has qualified for triennial lead and copper sampling; the next assessment will be in 1997.

One Underground Injection Well permit application was submitted to the TDEC Division of Water Supply in 1996. A researcher within the Environmental Sciences Division (ESD) at ORNL intends to perform research in subsurface fate and transport of colloids.

The K-1515 Sanitary Water Plant provides drinking water for the ETTP and for an industrial park located on Bear Creek Road south of the site. The DOE-owned facility is classified as a non-transient, non-community water-supply system by TDEC and is subject to state regulations. The plant is in compliance with the drinking-water quality standards; monthly and quarterly testing for required constituents is carried out and reported to TDEC. Requirements of the lead and copper rule have been met, and the plant has been granted approval to reduce monitoring for these constituents to once per year. In 1996, the DOE water treatment plant met Tennessee radiological and nonradiological standards except for one exceedence of the maximum contaminant level (MCL) for dichloromethane. In accordance with Tennessee rules, a public notice was issued for this exceedence. However, since dichloromethane is a common laboratory contaminant and resampling indicated no detectable levels, it was concluded that the exceedence was a false result.

A cross-contamination control program implemented at the Y-12 Plant, ORNL, and the ETTP prevents and eliminates cross-connections of sanitary water with process water and utilizes

back-flow prevention devices and an engineering review and permitting process. As part of the program, an inventory of installed back-flow prevention devices is maintained, and inspection and maintenance of the devices are conducted in accordance with regulatory requirements.

## 2.2.8 Clean Water Act

The CWA was originally enacted as the Water Pollution Control Act in 1948, then later established as the Federal Water Pollution Control Act in 1972. Since that time, the CWA received two major amendments. The objective of the CWA is to restore, maintain, and protect the chemical, physical, and biological integrity of the nation's waters. With continued amendments, the CWA has established a comprehensive federal and state program to protect the nation's waters from pollutants. Congress continues to work on amendments to and reauthorization of the CWA.

### 2.2.8.1 National Pollutant Discharge Elimination System

One of the strategies developed to achieve the goals of the CWA was the establishment by the EPA of limits on specific pollutants that are allowed to be discharged to waters of the United States by municipal sewage treatment plants and industrial facilities. In 1972, the EPA established the National Pollutant Discharge Elimination System (NPDES) permitting program to regulate compliance with these pollutant limitations. The program was designed to protect surface waters by limiting effluent discharges into streams, reservoirs, wetlands, and other surface waters.

The Y-12 Plant NPDES permit encompasses approximately 100 active point-source discharges or storm water monitoring locations requiring compliance monitoring that resulted in more than 9,000 laboratory analyses in 1996, in addition to numerous field observations. Monitoring of discharges demonstrates that the Y-12 Plant has achieved an NPDES permit compliance rate of more than 99%; biological monitoring programs conducted on nearby surface streams provide evidence of the continued ecological recovery of

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the streams. At the Y-12 Plant, there were ten NPDES noncompliances in 1996, compared with six in 1995 (Fig. 2.1). Only four of the non-compliances during 1996 were because of events that exceeded the wastewater discharge limits.

The ORNL NPDES permit, renewed in December 1996, lists 164 point-source discharges that require compliance monitoring. Approximately 100 of these are storm drains, roof drains, and parking lot drains. Compliance was determined by approximately 18,000 laboratory analyses and measurements in 1996, in addition to numerous field observations by ORNL field technicians. The NPDES permit limit compliance rate for all discharge points for 1996 was greater than 99% (Fig. 2.1). Most of ORNL's permit limit noncompliances for 1996 were for suspended solids in the storm water runoff from parking lots and construction activities.

The ETTP NPDES permit includes 4 major outfalls and 136 storm drain outfalls. From about 35,000 NPDES laboratory and field measurements completed in 1996, only 4 noncompliances occurred, indicating a compliance rate of more than 99% (Fig. 2.1).

### 2.2.8.2 Status of NPDES Permits

TDEC issued a new NPDES permit for the Y-12 Plant on April 28, 1995; it became effective on July 1, 1995. The previous Y-12 Plant NPDES permit (TN0002968) expired on May 23, 1990. The plant continued to operate through the first half of 1995 under the expired permit pending issuance of Tennessee Regulation 1200-4-1.05(5)(b). In May, the Y-12 Plant appealed two provisions of the permit: the biomonitoring limitations placed on East Fork Poplar Creek (EFPC) Outfall Point 201 and the mercury limitations at Monitoring Station 17. These limits are stayed while resolution of both issues is being sought by personnel from the Y-12 Plant and TDEC. The new permit addresses revisions that were in the renewal application, such as some previously unlisted miscellaneous outfalls. In addition, it requires storm water characterizations at selected monitoring locations in accordance with the Y-12 Plant Storm Water Pollution Prevention Plan,

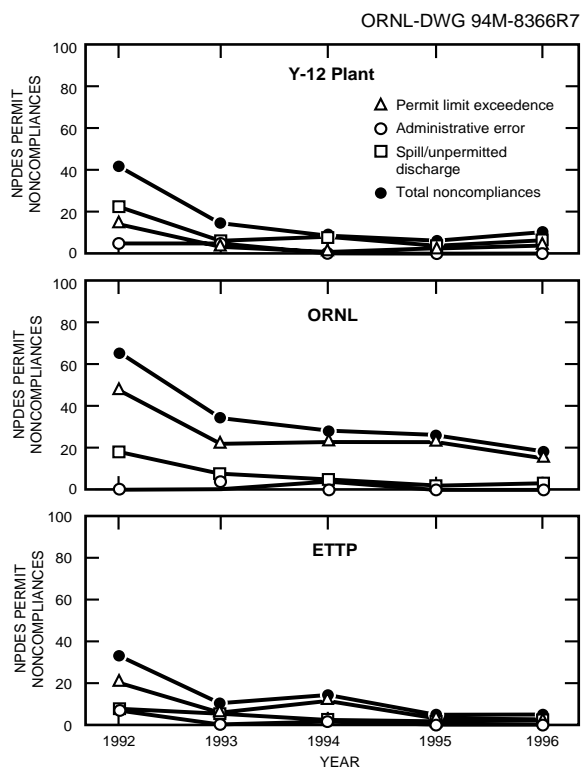


Fig. 2.1. Five-year summary of NPDES noncompliances.

which was approved by TDEC April 26, 1996. Other documents submitted to TDEC in accordance with the new NPDES permit include the revised Radiological Monitoring Plan, the Biological Monitoring and Abatement Program (BMAP) Plan, and a report on the analysis of fecal coliform bacteria levels at selected storm water monitoring points.

ORNL is currently operating under NPDES Permit 0002941, which was renewed by TDEC on December 6, 1996, and went into effect February 3, 1997. Compared with the previous permit, the new permit includes more stringent limits, based on compliance with water quality criteria, at a number of outfalls. The new permit also requires ORNL to conduct detailed characterization of numerous storm water outfalls, conduct an assessment and evaluation and modify the Radiological Monitoring Plan, develop and implement a Storm Water Pollution Prevention Plan, and develop and implement a chlorine control strategy. DOE appealed certain contested limits and conditions

of the renewed permit, including numeric limits on effluent mercury, arsenic, and selenium.

The ETTP is operating under NPDES Permit TN0002950, issued with an effective date of October 1, 1992. A major permit modification became effective June 1, 1995. As required by the permit, a Storm Water Pollution Prevention Plan was completed by October 1993. This plan (1) identifies areas having the potential to discharge pollutants to the receiving waters, (2) includes a pollutant control strategy to identify actions to minimize discharges of pollutants, and (3) outlines the development of annual sampling and analysis plans. Sampling as outlined in the FY 1996 Storm Water Pollution Prevention Sampling and Analysis Plan was initiated during the fourth quarter of 1995 and was completed in 1996. An evaluation of FY 1996 results was used to determine the scope of the FY 1997 Storm Water Pollution Prevention Sampling and Analysis Plan.

### 2.2.8.3 Sanitary Wastewater

The CWA includes pretreatment regulations for publicly owned treatment works (POTW). Sanitary wastewater for the Y-12 Plant is discharged to the city of Oak Ridge under an industrial and commercial user permit. The city of Oak Ridge staff performed its annual sanitary sewer compliance inspections on March 25, 1996, and September 9, 1996. No deficiencies of the Y-12 Plant Sanitary Sewer Compliance Program were noted during the inspections.

During 1996, the Y-12 Plant experienced two exceedences of the discharge permit issued by the city of Oak Ridge. Both exceedences were for mercury and occurred as a result of rehabilitation activities on the sanitary sewer. A multimillion dollar sanitary sewer upgrade project was initiated in 1996 and is expected to last through FY 1999.

As of this writing, the city of Oak Ridge is in the process of renewing its NPDES permit with TDEC. As a result, the city of Oak Ridge issued a six-month discharge permit for the Y-12 Plant until the state of Tennessee issues an NPDES permit to the city of Oak Ridge for the Oak Ridge Wastewater Treatment Plant. After the NPDES permit limits are established for the Oak Ridge

Wastewater Treatment Plant, the city will in turn issue a new discharge permit for the Y-12 Plant.

Sanitary sewer radiological sample results at the Y-12 Plant are routinely reviewed to ensure compliance with DOE Order 5400.5. As sample results are received, they are compared with the derived concentration guides (DCGs) listed in the order. No radiological parameter that is monitored (including uranium) has exceeded a DCG. Typically, the results are three orders of magnitude below DCG limits. The current Y-12 Plant permit sets a discharge limit for uranium and incorporates DOE Order 5400.5 guidelines. The DOE has filed an appeal of the radiological limitations of the permit.

At ORNL, sanitary wastewater is collected, treated, and discharged separately from other liquid wastewater streams through an on-site sewage treatment plant. Wastewater discharged into this system is regulated by means of internally administered waste acceptance criteria based on the plant's NPDES operating permit parameters. Wastewater streams currently processed through the plant include sanitary sewage from facilities in Bethel and Melton valleys, area runoff of rain water that infiltrates the system, and specifically approved small volumes of nonhazardous biodegradable wastes such as scintillation fluids. The effluent stream from the sewage treatment plant is ultimately discharged into White Oak Creek (WOC) through an NPDES-permitted outfall (X-01). Infiltration into the system and the discharge from the on-site laundry has, at times, caused the sludge generated during the treatment process to become slightly radioactive. As a result, the sludge is treated as solid LLW and is disposed of in an ORNL SWSA. ORNL has received funding and is carrying out comprehensive upgrades of its sanitary sewage system. Upgrades include sealing the collection system to reduce infiltration of contaminated groundwater and surface water and redirecting discharges from the laundry to appropriate alternative treatment facilities. The activity level of sludge continues to decline.

ETTP domestic wastewater is treated at the K-1203 Sewage Treatment Plant and discharged pursuant to the NPDES permit. A sewer use

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ordinance and an influent surveillance program are in effect to ensure that effluent from the K-1203 sewage treatment plant continues to meet all NPDES permit limits. The sewer lines have been relined and repaired to reduce rain water infiltration. The multiyear relining project was completed in July 1996.

### **2.2.8.4 Aquatic Resources Protection**

The U.S. Army Corps of Engineers, TVA, and TDEC conduct permitting programs for projects and activities with the potential to affect aquatic resources, including navigable waters, surface waters (including tributaries), and wetlands. These are the Corps of Engineers Section 404 dredge-and-fill permits, TDEC Aquatic Resources Alteration Permits (ARAPs), and TVA 26 approvals. (See Sect. 2.5, “Environmental Permits,” for ARAP permits.)

### **2.2.8.5 Oil Pollution Prevention**

Section 311 of the CWA regulates the discharges of oils or petroleum products to waters of the United States and requires the development and implementation of a Spill Prevention Control and Countermeasures Plan (SPCC) to minimize the potential for oil discharges. Currently, each facility implements a site-specific SPCC plan. This section was significantly amended by the Oil Pollution Act of 1990, which has as its primary objective the improvement of responses to oil spills.

The Oil Pollution Act requires certain facilities to prepare and implement a facility response plan for responding to a worst-case discharge of oil. The ETTP is subject to the requirements for preparing such a plan because of its oil storage capacity and location. An updated plan was submitted to the EPA on February 17, 1995. The plan includes designation of response personnel, description of response equipment, identification of the worst-case discharge scenario and associated response actions, personnel training requirements, testing and inspection requirements, and other oil spill-prevention and response measures.

No facility response plan was required for the Y-12 Plant or ORNL.

## **2.2.9 Clean Air Act**

Authority for enforcement of the Clean Air Act (CAA) is shared between TDEC for nonradioactive emission sources and EPA for radioactive emission sources. EPA also enforces rules issued pursuant to the 1990 CAA Amendment, Title VI—Stratospheric Ozone Protection.

### **2.2.9.1 General CAA Compliance**

The TDEC Air Permit Program is administered to ensure compliance with the federal CAA and TDEC air rules. All three ORR facilities are subject to the TDEC air permitting program rules. Each site is in compliance with all federal air regulations and TDEC air-permit conditions.

CAA program staff routinely participate in regulatory inspections and internal compliance assessment audits to identify areas for improvement in the operation of air sources in conformance with regulations or permit conditions. All major sources of air emissions are appropriately permitted, and documentation of compliance is maintained at each site. A number of minor sources that are exempt from permitting requirements under state of Tennessee rules are identified for internal purposes as well. All major emission sources permitted by TDEC are operating in compliance with those permits. Programs for permitting, compliance inspection, and documentation of compliance are in place and have been effective in ensuring that all ORR operations remain in compliance with all federal and state air pollution control regulations.

### **2.2.9.2 Compliance with 1990 CAA Amendments**

Under Title III—Hazardous Air Pollutants (HAPs), major emphasis has been on determining applicability of final rules promulgated by EPA during 1996. A final rule was promulgated pursuant to Section 112(r) for chemical accident release prevention. Evaluations were conducted as a

result of the rule to determine processes operated on the ORR that are covered or subject to the rule. Processes identified as covered were then placed on a schedule to comply with Risk Management Plan requirements of the rule by 1999.

Under Title V—Permits, EPA granted interim final approval of Tennessee's Title V Major Source Operating Permit Program. ETTP submitted a Title V application as part of Tennessee's early Title V submittal program. The other facilities continue to conduct permit hygiene in accordance with new air permit exemptions for major sources and process applications for submittal to TDEC as required in 1997. A comprehensive Title V permit, or combination of permits, for each ORR facility will replace the individual source permits that are currently active at each facility.

Under Title VI—Compliance activities consisted of maintenance of established programs for stratospheric ozone protection. These programs have been implemented at each facility for both motor vehicle air-conditioner and other refrigeration equipment that include elements for demonstrating compliance with equipment leak repair requirements, container labeling, regulated substances purchasing, and technician and equipment certifications.

### **2.2.9.3 National Emission Standards for Hazardous Air Pollutants for Radionuclides**

Compliance with the Radionuclide National Emission Standards for Hazardous Air Pollutants (Rad-NESHAP) dose limit of 10 mrem/year to the maximum exposed individual of the public was demonstrated by modeling emissions from major and minor point sources during periods of operation. The annual off-site effective dose equivalent (EDE) to the most-exposed member of the public for the ORR was 0.4 mrem in 1996, which is below the Rad-NESHAP compliance limit.

Continuous emissions monitoring is performed at the ETTP TSCA Incinerator, at seven stacks at ORNL, and at exhaust stacks serving uranium-processing areas at the Y-12 Plant. As of January 1, 1996, the Y-12 Plant had a total of 68 stacks, of which 60 were active and 8 were tempo-

rarily shut down. During 1996, four additional stacks were put into temporary shutdown at the Y-12 Plant. Therefore, monitored stacks at the Y-12 Plant went from 60 during the year to a low of 56 at the end of 1996. Grab samples and other EPA-approved estimation techniques are used on remaining minor emission points, grouped area sources, and fugitive emissions. All three facilities met the emission and test procedures of 40 CFR 61, Subpart H.

### **2.2.9.4 NESHAP for Asbestos**

The ORR facilities have numerous buildings and equipment that contain asbestos materials. The compliance program for asbestos management includes demolition and renovation inspections, identification, monitoring, abatement, and disposal of asbestos materials. Two asbestos releases of reportable quantities under CERCLA were identified at the ETTP in 1996. Release quantities were small with no observable off-site migration. No reportable quantities (RQs) were reported at the Y-12 Plant or ORNL.

### **2.2.9.5 Other NESHAPs**

On September 16, 1996, the Y-12 Plant Environmental Compliance Organization personnel initiated a request to DOE to discontinue beryllium stack sampling on the basis that continuous sampling is not required for regulatory compliance at the Y-12 Plant. The regulations require that the combined beryllium emissions from all beryllium sources be less than 10 grams over a 24-hour period. In addition, the regulations require that stack tests be conducted to determine emissions. This requirement was fulfilled for the Y-12 Plant in 1990 and 1991 when EPA Method 104 sampling, the regulatory required sampling, was conducted. Since that time, beryllium stack sampling has been conducted at the Y-12 Plant as a BMP. The BMP data indicated that combined emissions from monitored beryllium sources have been less than one gram per year. With DOE concurrence, BMP sampling for the beryllium stacks was discontinued on October 1, 1996.

### **2.2.9.6 State-Issued Air Permits**

The Y-12 Plant has 52 active air permits covering 262 air emission points. There are 157 documented exempt minor sources and 328 exempt minor emission points.

ORNL has 26 active operating permits. During 1996, the state rescinded four of ORNL's operating permits as insignificant and issued one additional permit for a new source.

There were 239 active air emission sources at the ETTP at the end of 1996. The total includes 50 sources covered by 11 TDEC air operating permits. All remaining air emission sources are exempt from permitting requirements.

### **2.2.10 Toxic Substances Control Act**

TSCA was passed in 1976 to address the manufacture, processing, distribution in commerce, use, and disposal of chemical substances and mixtures that present an unreasonable risk of injury to human health or the environment. TSCA mandated that EPA identify and control chemical substances manufactured, processed, distributed in commerce, and used within the United States. The EPA imposes strict information-gathering requirements of both new and existing chemical substances, including polychlorinated biphenyls (PCBs).

#### **2.2.10.1 Polychlorinated Biphenyls**

TSCA specifically banned the manufacture, processing, and distribution in commerce of PCBs, but authorized the continued use of some existing PCBs and PCB equipment. TSCA also imposed marking, storage, and disposal requirements for PCBs. The codified regulation governing PCBs mandated by TSCA is found at 40 CFR 761 and is administered by the EPA. Most of the requirements of 40 CFR 761 are matrix and concentration dependent. For example, the ban on manufacturing processing, use, and distribution in commerce applies to PCBs at any concentration. Storage and disposal requirements generally apply to PCBs at 50 parts per million

(ppm) or greater; however, these requirements may apply at lower concentrations in some instances. TDEC restricts PCBs from disposal in landfills and classifies PCBs as special wastes under Tennessee solid waste regulations. A special waste exemption is required from the state of Tennessee to dispose of PCBs at concentrations of 2 ppm up to 50 ppm in landfills. Additionally, PCB discharges into waterways are restricted by the state-regulated CWA and NPDES programs.

#### **2.2.10.2 Authorized and Unauthorized Uses of PCBs**

The EPA promulgated regulations in 1979 implementing the TSCA ban on the manufacture, use, processing, and distribution in commerce of PCBs; however, specific applications of PCBs were authorized for continued use under restricted conditions. A variety of PCB systems and equipment have been in service at the ORR during its 50-year history. Many of these systems and equipment were used per industry standards at the time, and their continued use was authorized under the 1979 PCB regulations. Systems that were authorized included transformers, capacitors, and other electrical distribution equipment; heat-transfer systems; and hydraulic systems. The vast majority of these PCB uses have been phased out at the ORR. Small amounts of PCBs remain in service in PCB light ballasts; however, ballasts containing PCBs are being replaced by non-PCB ballasts during normal maintenance. Most transformers that contained PCBs either have been retrofilled (replacement of PCB fluid with non-PCB dielectric fluid) to reduce the PCB concentration to below regulated limits or have been removed from service altogether. Some small pole-mounted transformers remaining in service at the ETTP and Y-12 Plant electrical systems are scheduled to be tested for PCBs during normal maintenance. It is unlikely that any of these small transformers contain PCBs at concentrations regulated for disposal; however, they are assumed to contain PCBs until verified otherwise.

The 1979, regulations did not anticipate the use of PCBs in many applications for which they were employed. As a result, those past uses not

specifically authorized present compliance issues under TSCA. At the ORR, unauthorized uses of PCBs have been found in building materials, lubricants, and nonelectrical systems. More such unauthorized uses are likely to be found during the course of D&D activities. The most widespread of these unauthorized uses of PCBs are PCB-impregnated gaskets in the gaseous diffusion process motor ventilation systems at the ETTP.

### **2.2.10.3 PCB Compliance Agreements**

The Oak Ridge Reservation PCB Federal Facilities Compliance Agreement (ORR-PCB-FFCA) between EPA Region 4 and DOE became effective on December 16, 1996. The agreement addresses PCB compliance issues at the ETTP, ORNL, the Y-12 Plant, and ORISE. For the ETTP, the agreement supersedes a previous agreement known as the Uranium Enrichment Toxic Substances Control Act Federal Facilities Compliance Agreement (UE-TSCA-FFCA). The UE-TSCA-FFCA continues in force for the Portsmouth and Paducah gaseous diffusion plants. Additionally, the ORR-PCB-FFCA supersedes the National PCB FFCA of August 8, 1996, between DOE-HQ and EPA-HQ for ORNL, the Y-12 Plant, and those wastes at the ETTP that were not covered under the UE-TSCA-FFCA.

The agreement specifically addresses the unauthorized use of PCBs, storage and disposal of PCB wastes, spill cleanup and/or decontamination, PCBs mixed with radioactive materials, PCB R&D, and records and reporting requirements for the ORR.

### **2.2.10.4 ETTP TSCA Incinerator PCB Disposal Approval**

The ETTP TSCA Incinerator is currently operating under an extension of EPA Region 4 approval granted on March 20, 1989. This extension is based on submittal of a reapplication for PCB disposal approval filed with EPA Region 4 on December 20, 1991, which was within the time frame allowed for reapplication. Minor amendments, updates, and corrections to this reapplication identified by DOE have been made in

the interim and have been submitted to EPA. Since the submittal of the December 20, 1991, reapplication, a joint RCRA/PCB permit reapplication has been under development. This joint reapplication was submitted in March 1997 to TDEC under RCRA for the treatment of hazardous wastes and to EPA Region 4 for the disposal of PCB wastes. The new reapplication will replace the December 20, 1991, PCB disposal reapplication. In anticipation of this joint application, EPA Region 4 has delayed action on renewal of the PCB incineration approval.

### **2.2.10.5 PCB Research and Development Approvals**

EPA Region 4 has previously granted ORNL authorization to conduct R&D for development of alternative disposal techniques for PCBs. The approvals have authorized PCB R&D using stabilization/solidification techniques, base-catalyzed destruction processes, a chemically enhanced oxidation/reduction process, and a microbial degradation procedure. Final reports were submitted in 1996 for the stabilization/ solidification and the base-catalyzed destruction projects. Currently active R&D projects include the chemically enhanced oxidation/reduction process conducted by ESD and the microbial degradation procedure conducted by the Chemical Technology Division. Two additional PCB R&D approvals are being planned by the Chemical Technology Division. Upon initiation, these projects will operate under the criteria established in the ORR-PCB-FFCA.

### **2.2.11 Federal Insecticide, Fungicide, and Rodenticide Act**

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) governs the sale and use of pesticides and requires that all pesticide products be registered by EPA before they may be sold. The regulations for the application, storage, and disposal of pesticides are presented in 40 CFR 150–189.

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The Y-12 Plant, the ETTP, and ORNL maintain procedures for the storage, application, and disposition of pesticides. Individuals responsible for application of FIFRA materials are certified by the Tennessee Department of Agriculture. If a pesticide can be used according to directions without unreasonable adverse effects on the environment or applicator (i.e., if no special training is required), it is classified for general use. A pesticide that can harm the environment or injure the applicator even when being used according to directions is classified for restricted use.

No restricted-use pesticide products are used at the Y-12 Plant, ETTP, or ORNL. Safrotin®, used for the control of cockroaches, is the only restricted-use pesticide stored at the Y-12 Plant. No purchases of this restricted-use material have been made since August 1993, and it was last used in 1995. Ficam-W, a general use pesticide, has been substituted for Safrotin, and efforts for proper disposal of the remaining Safrotin are under way. An inventory of pesticide products is maintained for use at each facility. It is site policy to store, apply, and dispose of these products in a manner that ensures full compliance with FIFRA requirements.

### 2.2.12 Emergency Planning and Community Right-To-Know Act

The Emergency Planning and Community Right-To-Know Act (EPCRA), also referred to as SARA Title III, requires reporting of emergency planning information, hazardous chemical inventories, and environmental releases to federal, state, and local authorities. The ongoing requirements of EPCRA are contained in Sections 302, 303, 304, 311, 312, and 313 of SARA Title III (Table 2.8).

The ORR had no releases subject to Section 304 notification requirements during 1996. The Section 311 lists are updated frequently and are provided to the appropriate officials. The Section 312 inventories for 1996 identified 60 hazardous chemicals, documented their locations, and summarized the hazards associated with them. Of

these Section 312 chemicals, 43 were located at the Y-12 Plant, 26 at ORNL, and 19 at the ETTP.

Under Section 313, four toxic chemicals were reported for 1996. Release data for 1995 and 1996 are summarized in Table 2.9. Compared with 1995 releases, there was a 27% reduction in total reportable toxic-chemical releases in 1996.

### 2.2.13 Environmental Occurrences

CERCLA requires notification of the National Response Center if a nonpermitted release of an RQ or more of a hazardous substance (including radionuclides) is released to the environment

**Table 2.8. EPCRA (SARA Title III) compliance information for the ORR**

Y-12 Plant	ORNL	ETTP
<i>302–303, Planning notification<sup>a</sup></i>		
In compliance	In compliance	In compliance
<i>304, Extremely hazardous substance release notification<sup>b</sup></i>		
In compliance	In compliance	In compliance
<i>311–312, Material safety data sheet/chemical inventory<sup>c</sup></i>		
In compliance	In compliance	In compliance
<i>313, Toxic chemical release reporting<sup>d</sup></i>		
In compliance	In compliance	In compliance

<sup>a</sup>Requires that Local Emergency Planning Committee and State Emergency Response Commission be notified of EPCRA-related planning.

<sup>b</sup>Addresses reporting to state and local authorities of off-site releases.

<sup>c</sup>Requires that either material safety data sheets (MSDSs) or lists of hazardous chemicals for which MSDSs are required be provided to state and local authorities for emergency planning.

<sup>d</sup>Requires that releases of toxic chemicals be reported annually to EPA and the state.



Table 2.9. EPCRA Section 313 toxic chemical release summary for the ORR

Chemical	Year	Quantity (lb)			
		Y-12 Plant <sup>a</sup>	ORNL	ETTP	Total
Methanol	1995	36,300	272	14	36,586
	1996	27,630	107	0	27,737
Hydrochloric acid	1995	1,170	81	69	1,320
	1996	870 <sup>b</sup>		160	1,030
Lead	1995	14	5,948	19	5,981
	1996	9	3,355	69	3,433
Nitric acid	1995	222	1	0	223
	1996	161	1	0	162
Tetrachloroethene	1995	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>
	1996	1	32	1	34
Total	1995	37,706	6,302	102	44,110
	1996	28,671	3,495	230	32,396

<sup>a</sup>Represents total releases to air and water, and includes off-site transfer.

<sup>b</sup>On July 25, 1996, EPA changed the EPCRA 313 implementing regulations to require reporting only for aerosol forms of hydrochloric acid.

<sup>c</sup>Tetrachloroethylene was below the threshold reporting value for 1995.

within a 24-hour period. The CWA requires that the National Response Center be notified if an oil spill causes a sheen on navigable waters, such as rivers, lakes, or streams. When notified, the National Response Center alerts federal, state, and local regulatory emergency organizations so they can determine whether government response is appropriate.

During 1996, Y-12 Plant staff reported no CERCLA RQ releases to federal and state agencies.

The National Response Center and Tennessee Emergency Management Agency (TEMA) were notified of four incidents that involved oil sheens observed on EFPC.

During 1996, ORNL reported two incidents involving oil sheens, one on First Creek and one on WOC, both within the ORNL main plant area. The sheen on WOC (April 1, 1996) was caused by leakage from a private vehicle; the sheen on First Creek (December 5, 1996) was attributed to a vegetable oil spill. The National Response Center and TEMA were notified.

In 1996, two releases occurred at the ETTP that required notification of the National Response Center or TEMA. These involved the discovery of asbestos-containing material from plant steam lines on the ground.

## 2.3 DOE ORDER COMPLIANCE

In 1995 DOE implemented Standards/ Requirements Identification Documents (S/RIDs), which include all federal, state, and local requirements applicable to the Y-12 Plant, ETTP, and ORNL. The S/RIDs include mandatory contractor requirements from the DOE orders of primary interest to the Defense Nuclear Facilities Safety Board (DNFSB). The S/RIDs covering all environment-, safety-, and health-related activities were included in the DOE contracts for LMES and LMER in October 1995 and January 1996, respectively. This change established the S/RIDs as the contractual set of environment, safety, and health (ES&H) requirements rather than DOE orders.

In 1996, LMER and DOE implemented the “Necessary and Sufficient” process for ES&H. Standards identified during this process have replaced most of the S/RIDs for ORNL. LMES, with DOE, is also using the “Necessary and Sufficient” process and is working to have standards approved in 1997.

### **2.3.1 DOE Orders 5400.1, General Environmental Protection Program, and 231.1, Environment, Safety, and Health Reporting**

Through DOE’s Accelerated Orders Reduction effort, certain requirements in DOE Order 5400.1, “General Environmental Protection Program,” have been modified; some have been transferred to DOE Order 231.1, “Environment, Safety and Health Reporting;” and others have been canceled. For example, the requirement to produce the annual site environmental report documenting the site’s environmental management performance has been transferred to DOE Order 231.1. However, canceled orders or paragraphs of orders incorporated by reference into a contract shall remain in effect until the contract is modified. DOE Order 5400.1 remains the contractual requirement for LMES; thus, this report is prepared as a requirement of DOE Order 5400.1.

DOE Order 5400.1 establishes environmental protection program requirements, authorities, and responsibilities for DOE operations to ensure compliance with applicable federal, state, and local environmental protection laws and regulations, executive orders, and internal DOE policies. The order specifically defines the mandatory environmental protection standards (including those imposed by federal and state statutes), establishes reporting of environmental occurrences and periodic routine significant environmental protection information, and provides requirements and guidance for environmental monitoring programs. Implementation of the order is provided by specific program plans, as detailed

in Chapter III of the order. The internal environmental protection programs mandate the creation of several environmental reports.

An environmental monitoring plan is to be prepared, reviewed annually, and updated every three years or as needed. The *Environmental Monitoring Plan for the Oak Ridge Reservation* (EMP) (DOE 1995b) was reissued by DOE in May 1995 as a controlled document. The EMP provides a single point of reference for the effluent monitoring and environmental surveillance programs of the Y-12 Plant, ORNL, the ETTP, and ORR areas outside specific facility boundaries. As of this writing, the EMP is being revised to reflect extensive monitoring changes during 1997. The three ORR sites are in compliance with DOE Order 5400.1. Selected requirements demonstrating compliance follow.

#### **2.3.1.1 Pollution Prevention/Waste Minimization**

The fundamental ORR pollution prevention function is to implement projects that result in the creation of less waste. This fundamental function is supported by three ancillary activities: (1) providing technical assistance (identifying and justifying opportunities for projects); (2) developing the overall program (awareness activities, planning, budgeting, reporting); and (3) administering the program (interfacing and communicating with site generator organizations, DOE, and outside organizations).

A central Pollution Prevention Information Management System has been created to integrate and synthesize information collected from tracking systems that have been developed at all three sites to track pollution prevention progress. Pollution prevention councils have been established at all three sites, with representation from each of the site organizations. The councils exchange information to promote pollution prevention activities. Responsibilities within the divisions at each site include the development of pollution prevention goals and implementation activities necessary to reduce both the amount and the toxicity of waste and environmental pollutants, communication of LMES pollution prevention

goals, documentation and communication of progress made toward implementation, and promotion of employee awareness.

During 1996, several source-reduction and recycling projects were completed. Projects include facility-specific activities as well as programmatic activities. Table 2.10 summarizes the results of selected recycling activities on the ORR during the past 5 years.

Three mechanisms have been developed and employed to fund pollution prevention implementation projects. Project proposals are submitted to the pollution prevention program. The proposals are evaluated and submitted to one of three funding avenues: (1) DOE hazard-quotient-(HQ-) funded high return on investment (ROD), (2) the reservation-funded High Investment Value (HiVal) System, or (3) the site-funded generator set-aside program. The generator set-aside fund is the newest funding mechanism; it taxes generated waste. The tax is accumulated for funding implementation projects.

**2.3.1.2 Groundwater**

The hydrogeologic system at the Y-12 Plant has been divided into three hydrogeologic regimes (or watersheds) based on topography, surface water, and groundwater flow patterns. Monitoring requirements specified by RCRA postclosure permits and CERCLA actions for each of the three

regimes reflect the physical characteristics of these hydrogeologic units; monitoring objectives are defined accordingly. A fully integrated monitoring network (including springs and monitoring wells) has been established that meets RCRA postclosure, CERCLA, and DOE Order 5400.1 requirements to monitor flow from each hydrogeologic regime at the Y-12 Plant. These requirements specify the monitoring of plume-boundary and exit-pathway stations both east and west of the Y-12 Plant. Under the integrated program, two or more regulatory requirements are often satisfied by monitoring of one station because parameter lists are standardized and technical objectives between regulations frequently overlap. In addition, monitoring to detect any potential release of contaminants at uncontaminated waste management units is performed as specified in RCRA postclosure permits, CERCLA records of decision (RODs), and non-hazardous solid waste disposal facility (SWDF) operating permits. Limited monitoring continued in 1996 to evaluate the effectiveness of UST removals and corrective actions conducted primarily in the early 1990s.

Exit-pathway monitoring was initiated at ORNL in 1993. The program is designed to monitor groundwater and streams at four general locations that are thought to be likely exit pathways for ORNL groundwater. The ORNL waste area grouping (WAG) perimeter-monitoring network includes perimeter wells at ten WAGs.

**Table 2.10. Results of selected Oak Ridge Reservation recycling activities for the past 5 years**

Material	Quantity (tons)				
	1992	1993	1994	1995	1996
Aluminum cans	24.8	28.7	25.3	24	22.1
Cardboard	315.4	428.5	354.6	241.9	230.6
Paper	552.8	786.6	734.4	906.2 <sup>a</sup>	851.9
Ash	<i>b</i>	<i>b</i>	<i>b</i>	15,294.7	14,209
Toner cartridges	<i>b</i>	<i>b</i>	<i>b</i>	10.5	8.4

<sup>a</sup>The ETTP combines cardboard and paper categories. Cardboard recycled at the ETTP is included in the paper total for 1996.

<sup>b</sup>Data not collected.

Exit-pathway monitoring at the ETTP is conducted at locations where groundwater flow from relatively large areas converges before discharging to surface water locations. The exit-pathway monitoring of groundwater quality in both the unconsolidated zone and the bedrock is supported by surface water monitoring at these convergence points. The responsibility for monitoring groundwater at the ETTP exit-pathway wells was assumed by the Integrated Water Quality Program in late 1996.

The 1996 annual TDEC RCRA groundwater compliance evaluation inspections were conducted in January and December at the Y-12 Plant and in October at ORNL. No findings or recommendations were issued as a result of the inspections.

### **2.3.2 DOE Order 5400.5, Radiation Protection of the Public and the Environment**

DOE Order 5400.5 provides guidance and establishes radiation protection standards and central practices designed to protect the public and the environment against undue risk from DOE operations. This order requires that no member of the public receive an EDE in a year greater than 100 mrem via all pathways and that no member of the public receive a radiation dose equivalent greater than 10 mrem in a year from airborne emissions. In addition, dose limits imposed by other federal regulations (40 CFR Parts 61, 191, and 192 and 10 CFR Parts 60 and 72) must be met. The primary dose limit is expressed as an EDE, which requires the weighted summation of doses to specified organs of the body. Monitoring effluents released to the environment is required to ensure that radiation doses to the public are as low as reasonably achievable (ALARA) and are consistent with prescribed dose standards.

### **2.3.3 DOE Order 5820.2A, Radioactive Waste Management**

DOE Order 5820.2A establishes the policies and minimum requirements for managing ORR radioactive wastes and the radioactive component of mixed wastes. The order requires that each DOE site prepare a waste management plan for radioactive waste generation and TSD operations. In previous years each site had prepared its own waste management plan. These plans have now been consolidated into one document, The *Oak Ridge Reservation Waste Management Plan* (MMES 1995).

ORNL manages TRU waste and LLW. Radioactive waste management activities at both the ETTP and Y-12 Plant are primarily related to LLW. Although material contaminated with TRU elements exists on the ETTP, the concentrations are less than the limits for TRU waste.

## **2.4 APPRAISALS AND SURVEILLANCES OF ENVIRONMENTAL PROGRAMS**

Numerous appraisals, surveillances, and audits of the ORR environmental activities occurred during 1996 (see Tables 2.11, 2.12, and 2.13). These tables do not include internal LMES or Lockheed Martin corporate assessments.

### **2.4.1 Defense Nuclear Facilities Safety Board**

In September 1994, during a DNFSB tour of a storage building in 9204-2E, a discrepancy with specific stipulations of the criticality safety approval for storage of fissile material in that area

**Table 2.11. Summary of environmental audits and assessments conducted at the Y-12 Plant, 1996**

Date	Reviewer	Subject	Issues
1/29–30	TDEC	RCRA Audit	0
2/7	EPA	EPA Audit	0
4/17–19	Wastren (for DOE)	Defense Programs Toxic Release Inventory Review	0
5/21	TDEC/DOE-O	Clean Air Compliance Inspections	0
6/24	EPA	EPA Visit	0
6/25	DOE	NPDES Sampling	0
6/26	TDEC	Y-12 Landfill VI	0
6/26	TDEC	Y-12 Landfill V	0
6/26	TDEC	Y-12 Landfill VII	0
6/28	TDEC/DOE-O	VEE of Stack 67	0
8/8–13	TDEC/DOE-O	Clean Air Compliance Inspections	0
11/22	TDEC	Y-12 Centralized Landfill II Postclosure Lane Inspection	0
12/3	TDEC	Y-12 Landfill IV	0

**Table 2.12. Summary of environmental audits and assessments conducted at ORNL, 1996**

Date	Reviewer	Subject	Issues
2/26	TDEC/DOE-O	Inspection of First Creek Riparian Corridor	0
3/12	TDEC/DOE-O	Opacity Evaluation Steam Plant	0
3/12–13	TDEC	Inspection of RCRA generator areas and treatment, storage and disposal operations	0
3/20–21	TDEC/DOE-O	Permitted emission sources	0
3/23–24	TDEC/DOE-O	Permitted emission sources	0
11/14	TDEC/DOE-O	Inspection of Process Waste Treatment Plant Upgrades Project	0
11/25	TDEC/DOE-O	Inspection of 4508 and 6000 Area Dechlorinators	0

was identified. As a result, a number of operations at the Y-12 Plant were curtailed. However, environmental management operations (compliance monitoring, reporting, and oversight) have continued operations, and there have been no environmental impacts as a result of the stand-down. Work continues at the Y-12 Plant to respond to

recommendations from the board concerning formality of operations.

## 2.5 ENVIRONMENTAL PERMITS

Table 2.14 contains a summary of environmental permits for the three ORR sites.

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**Table 2.13. Summary of environmental audits and assessments conducted at the ETTP, 1996**

Date	Reviewer	Subject	Issues
1/24	TDEC	SDWA Inspection	0
1/24	TDEC/DOE-O	CAA Inspection	0
1/30	TDEC	RCRA Inspection of Tech. Demo Area	0
2/15	TDEC, TDEC/DOE-O	Solid Waste Inspection	0
2/28	TDEC	RCRA Inspection of TSCA Incinerator	0
3/11	TDEC	CWA Inspection	0
3/25	TDEC, TDEC/DOE-O	RCRA Inspection	0
3/26	TDEC	RCRA Semiannual Inspection of TSCA Incinerator	0
5/10	Corps of Engineers	CWA Inspection of Wetland	0
7/24	Corps of Engineers	CWA Inspection of Bridge Project	0
7/24	TDEC	Solid Waste Inspection of Demolition Project	0
9/23	TDEC	Annual RCRA Inspection	0
9/26	TDEC	RCRA Semiannual Inspection of TSCA Incinerator	0
11/18	TDEC	Solid Waste Inspection of Demolition Project	0
12/11	TDEC, TDEC/DOE-O	CWA Inspection	0

## 2.6 NOTICES OF VIOLATIONS AND PENALTIES

On February 1, 1996, the Y-12 Plant received an order and assessment of civil penalty from TDEC for reported violations of the RCRA permit at the Waste Oil/Solvent Storage Unit (OD-9). However, TDEC later dismissed the order, and no penalty was assessed. In a like manner, EPA Region 4 issued a compliant and compliance order on September 24, 1996, for RCRA inspection deficiencies at the OD-9 facility. A fine of \$22,500 was paid on November 22, 1996.

The Y-12 Plant received a NOV from TDEC on 2/7/96 for an NPDES permit noncompliance that occurred in December 1995. The noncompliance was reported by the Y-12 Plant to the TDEC as an exceedence of the permit limit for chlorine measured at monitoring location 201 in EFPC.

Tennessee State Landfill Permit IDL-01-103-0083 prohibits the disposal of radioactive waste in the Industrial Landfill V at the Y-12 Plant. Thirty-five pCi/g of uranium has been established by TDEC and DOE as the threshold above which waste will be considered to be radioactively contaminated. In December 1996, on reviewing waste characterization data from an ongoing disposal activity, it was discovered that 167 B-25 boxes containing waste exceeded that limit. The average uranium activity per gram for waste in the boxes was 256 pCi/g with a maximum of 850 pCi/g of uranium activity. These boxes were disposed of in Industrial Landfill V between April 1996 and discovery of the noncompliance in December 1996.

In a separate but related incident, a waste shipment from the ETTP to Y-12's Landfill V between December 20, 1996, and January 27,

Table 2.14. Summary of permits as of December 1996

	Y-12 Plant	ORNL	ETTP
<i>Resource Conservation and Recovery Act</i>			
RCRA operating (part A and part B)	4 <sup>a</sup>	3	4
Part B applications in process	1 <sup>b</sup>	2	0
Postclosure	3 <sup>c</sup>	1	0
Permit-by-rule units	45 <sup>d</sup>	173	92
Solid waste landfills	6 <sup>e</sup>	0	0
Annual petroleum UST facility certificate	2	1	1
Transporter permit	1	1	1
<i>Clean Water Act</i>			
NPDES	1 <sup>f</sup>	1	1
Storm water	1 <sup>g</sup>	1 <sup>g</sup>	1 <sup>g</sup>
Aquatic resource alteration/U.S. Army Corps of Engineers 404 permits	1	3	4
General storm water construction	2 <sup>h</sup>	0	2
<i>Clean Air Act</i>			
Operating air	52	26	11
Construction	0	0	2
Prevention of significant deterioration	0	0	0
<i>Sanitary Sewer</i>			
Sanitary sewer	1	0	0
<i>Toxic Substances Control Act</i>			
TSCA Incinerator	0	0	1
R&D for alternative disposal methods	0	3	0
<i>Safe Drinking Water Act</i>			
Class V Underground Injection Control Permit application in progress	0	1	0

<sup>a</sup>Four permits have been issued, representing 16 active units.

<sup>b</sup>One application is under review by TDEC, representing 3 active units.

<sup>c</sup>Three permits have been issued, representing units closed under RCRA in Bear Creek Hydrogeologic Regime, Chestnut Ridge Hydrogeologic Regime, and UEFPC Regime.

<sup>d</sup>Includes tanks, sumps, and CWA-permitted TSD facilities.

<sup>e</sup>Four landfills are operational: one (Spoil Area 1) is inactive and has an ROD under CERCLA; and one (Landfill II) is in postclosure care and maintenance.

<sup>f</sup>Issued 4/28/95 and effective 7/1/95. TDEC has incorporated requirements for storm water into individual NPDES permits.

<sup>g</sup>TDEC has incorporated into individual NPDES permits.

<sup>h</sup>Notice of intent that accesses a general NPDES permit. Two notices of intent remain on file for construction at Landfill V, VII, and for tree maintenance on tributary 7 at the Walk-in Pits closure.

1997, was discovered to have been shipped in error. The waste was in fact mixed RCRA waste (incinerator ash from a test burn at the ETTP TSCA incinerator) and not nonhazardous/nonradioactive solid waste as was expected. The documentation and shipping papers for the two waste streams had been switched in error. Resolution of these exceedences is expected to continue into calendar year (CY) 1997.

In addition, ETTP received an NOV in 1996 for installation of culverts into waters of the state without a permit. The culverts were installed in tributaries to Grassy Creek along the powerline right-of-way between ETTP and ORNL.

ORNL received two TDEC NOVs in 1996 for NPDES permit limit excursions; one NOV was received in February 1996 and the other in September 1996. ORNL provided responses to TDEC as to corrective actions for each excursion maintained in the NOVs. No fines or penalties were assessed by TDEC.

## 2.7 CURRENT ISSUES

### 2.7.1 Actions Filed by Friends of the Earth, Inc.

On January 17, 1992, Friends of the Earth, Inc., a nonprofit corporation, filed a lawsuit against Admiral James D. Watkins (then secretary of energy) and DOE in the U.S. District Court for the Eastern District of Tennessee, Northern Division. The suit alleges that DOE is violating the terms and conditions of its NPDES permits for the Y-12 Plant, ORNL, and the ETTP. Specifically, the complaint alleges that discharges of certain quantities of various pollutants into tributaries of the Clinch River that have their sources at the Y-12 Plant, ORNL, and the ETTP have exceeded (and are exceeding) the allowable discharge limits established by the NPDES permits. The suit seeks to force DOE to comply in all respects with its NPDES permits, declaratory judgments, and the award of various other costs.

On September 26, 1996, U. S. District Judge Leon Jordan issued an order requiring DOE to

install tablet dechlorinator units at the Y-12 Plant at sources of chlorinated water to ensure compliance with the requirements of the facility's NPDES permit and to eliminate all unpermitted outfalls at the Y-12 Plant. The order also required DOE to conduct a comprehensive survey of all pipes, sinks, and other connections to the storm drain systems at the Y-12 Plant, ORNL, and the ETTP by September 26, 1997. A copy of the report summarizing the survey must be provided to Friends of the Earth by mid-October 1997.

Friends of the Earth has asked the court to reconsider the order. At the time of this writing, a decision has not been issued by the court.

### 2.7.2 Hazardous/Toxic Waste Off-Site Shipment Moratorium

In May 1991, a moratorium on the off-site shipment (to non-DOE sites) of PCB and RCRA hazardous waste was implemented throughout the DOE complex, including the DOE sites located on the ORR. The purpose of the moratorium is twofold: (1) to ensure that hazardous/toxic wastes shipped from DOE facilities to commercial TSD facilities do not have bulk (volume) radioactive contamination as a result of DOE operations and (2) to ensure that the wastes do not have surface contamination exceeding DOE Order 5400.5 criteria unless the receiving facility is specifically licensed to manage radioactive waste. The moratorium for a given site will remain in effect until the site receives approval from DOE to resume off-site shipments using site-specific procedures that have been reviewed and approved by DOE.

In October 1993, the ETTP received a partial lifting of the moratorium for wastes composed of solid materials that do not have the potential for bulk contamination. The ETTP moratorium continues to remain in effect for hazardous/toxic wastes that are not solid materials (because of the potential for bulk contamination) until such time as DOE develops generic criteria for bulk contamination release. Off-site shipments of solid, hazardous/toxic wastes resumed at the ETTP following DOE's issuance of the partial lifting.



The moratorium at the Y-12 Plant was fully lifted by DOE in January 1994. The Y-12 Plant resumed off-site shipment activities for hazardous/toxic wastes following the lifting of the site moratorium.

In November 1994, ORNL received a partial lifting of the moratorium for wastes composed of solid materials that do not have the potential for bulk contamination. The ORNL moratorium continues to remain in effect for hazardous/toxic wastes that are not solid materials (because of the potential for bulk contamination) until such time as DOE develops generic criteria for bulk contamination release. ORNL resumed activities for the off-site shipment of solid, hazardous/ toxic wastes following DOE's issuance of the partial lifting. ORNL received a further partial lifting of the moratorium in 1996 with DOE approval of a "no rad added" procedure. This allowed shipment of wastes that could be certified by process knowledge as nonradioactive.

### **2.7.3 Tennessee Oversight Agreement**

On May 13, 1991, the state of Tennessee and DOE entered into a five-year monitoring and oversight agreement in which DOE agreed to provide the state financial and technical support for "independent monitoring and oversight" of DOE activities on the ORR. In June 1996, the state and DOE signed a five-year extension of the agreement that will expire in June 2001. The agreement provides the state of Tennessee \$26.15 million over the five-year period. Activities that are conducted under the agreement include oversight of DOE's environmental monitoring, waste management, ER, and emergency management programs. The agreement is intended to assure Tennessee citizens that their health, safety, and environment are being protected by DOE through existing programs and substantial new commitments.

TDEC is the lead Tennessee state agency for implementation of the agreement. TDEC has established the Tennessee Department of Environment and Conservation/DOE Oversight Division (TDEC/DOE-O), located in the city of Oak Ridge.

TDEC has entered into contracts with various state and local agencies to support oversight activities. Contracts have been signed with TWRA for fish and wildlife monitoring activities, TEMA for emergency management support, and the ORR Local Oversight Committee for assistance in achieving a better public understanding of the issues and activities on the ORR.

A DOE-Tennessee Oversight Agreement (TOA) steering committee composed of site and major program representatives has been established to coordinate implementation of the TOA and to promote consistency in its implementation across the ORR. LMES, LMER, and other selected DOE prime contractors have established internal organizations, including the designation of TOA coordinators, to facilitate implementation of the agreement.

To date, a variety of activities have been conducted under the agreement. DOE has provided security clearances and training necessary for state employees to gain access to the sites. Environmental data and documents pertaining to the environmental management, ER, and emergency management programs are provided or made available to the state for its review. TDEC/DOE-O routinely visits the three DOE sites to attend formal meetings and briefings, conduct walk-throughs of buildings and grounds, and conduct observations of site operations to assess compliance with environmental regulations. During CY 1996, TDEC/DOE-O continued its Facility Survey Program by conducting 32 walk-through assessments of buildings on the ORR. The goal of this program is to provide an independent evaluation of the conditions of facilities on the ORR that can be used to support risk assessment.

TDEC/DOE-O has also initiated an environmental monitoring and sampling program. In December 1995, TDEC/DOE-O provided to DOE their CY 1996 Environmental Monitoring Plan. The plan addressed the state's intentions in the areas of sampling, site audits and inspections, review of sampling and analysis of data generated by DOE, review of plans, and oversight. Through these activities, the state intends to characterize and monitor chemical and radiological emissions

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in the air, water, and soil, both on and off the ORR. TDEC/DOE-O also provided DOE with quarterly status reports of its environmental monitoring activities. It is anticipated that TDEC/DOE-O will soon provide DOE with its environmental monitoring report for CY 1996 activities and an environmental monitoring work

plan for CY 1997. In October 1996, TDEC/DOE-O published a *Status Report to the Public* (TDEC 1997b), which presented its current findings and ways to improve public understanding of the complex issues raised by federal facility cleanup.